Amendment

FOT THE TITLE

(Currently amended) "Resilient and Rugged Multi-layered Probe".

FOR THE SPECIFICATION

[0008] In one embodiment of the invention, the metal probe tip is used to probe the signal of the wafer ~~without being support by any medium~~. Further, the metal tip is able to rotate about an axis with a specific~~limited~~ angle and to lift or dive as required.

[0011] In a further embodiment of the invention, the probe tip is protrusive~~not supported by a medium~~ to probe the signal of the substrate. In addition, the metal probe tip can rotate around an axis with a specific~~limited~~ angle and can dive and lift.

[0013] In yet another embodiment of the invention, the probe tip is ~~not supported by a medium~~protrusive to probe the signal of the substrate. In addition, the probe tip can rotate around an axis with a specific~~limited~~ angle and can dive and lift.

[0016] Figure 1A shows a side view of an embodiment of a resilient and rugged probe provided by the present invention;

Figure 1B shows movements of the resilient and rugged probe;

Figure 1C is a bottom view of the resilient and rugged probe;

[0020] Figure 5A is a cross sectional view showing a resilient and rugged probe in another embodiment; and

Figure 5B is a bottom view of the resilient and rugged probe.

[0021] Referring to Figure 1A, the structure of a resilient and rugged probe in one embodiment is shown. The probe 10 is used to measure the on-wafer signal. In Figure 1A, the probe 10 includes a metal probe tip 102, a resilient soft multi-layered dielectric substrate 104, a planar transmission structure 106, and a fixed end 108 for supporting the probe 10. The metal probe tip 102 ~~is suspended~~extends outward and suspends from the planar transmission structure into the surrounding air and has a claw shape ~~in the air medium~~. ~~Without being supported by any attachment of the wafer, t~~The probe tip 102 can move up and down and rotate within a limited range while measuring an uneven or non-planar object. The object can then be probed and measured. The planar transmission structure 106 is coupled to the metal probe tip 102 and attached to the resilient soft multi-layered dielectric substrate 104. The fixed end 108 is coupled to the resilient soft multi-layered dielectric substrate 104 and the planar transmission structure 106 to support and hold the probe 10, and functions as a transmission structure converter of the probe to connect the planar transmission structure 106 and the coaxial transmission structure 120. As shown in Figure 1C, the coaxial transmission structure 120 is clearly illustrated from the bottom view of the probe 10 and an expanded view of the coaxial transmission structure 120 is shown on the right side. Since the probe 10 is made of metal material and multi-layered soft dielectric material, the far end of the fixed end 108, that is, the metal probe tip 102, allows movement of rotating 110 with an ~~limited~~-angle ϕ ~~110~~ and diving and lifting 112 with an angle θ, as shown in Figures 2 and 4 respectively.

[0024] Figure 4 shows the structure of another embodiment of a resilient and rugged probe. Figure 5A shows the cross-sectional view of the resilient and rugged probe. In Figure 5A, the probe 50 includes a probe tip 502, a planar transmission structure 504, and a multi-layered dielectric material 506. The probe tip 502 ~~is suspended~~ extends outward and freely suspends from the planar transmission structure into the surrounding air and has a claw shape ~~with the air as a medium~~. Since the probe tip 502 is not attached on the dielectric material~~supported by any attachment of the substrate~~, the object with an uneven or non-planar structure can be measured by moving the probe up and down and rotating the probe within a limited range. The planar

transmission structure 504 is coupled to the probe tip 502, and can be replaced with a connector. The multi-layered dielectric material 506 is coupled to the planar transmission structure 504 and the probe tip 502. Devices 508 could be embedded into the multi-layered dielectric material 506. The device 508, as shown in Fig. 5B, includes a multi-layered microwave circuit 520, a vertical connector 522 or a matching circuit device 524. In this embodiment, the probe 50 can designed as an impedance pre-matching type of probe attached with a bias network to measure the non-system impedance matching device or module. In addition, the probe 50 can be assembled into a mixer type probe to analyze and measure the hybrid chip or device module vector network on the substrate.